Experiences of practice facilitators working on the Improved Delivery of Cardiovascular Care project

Retrospective case study

Clare Liddy MD MSc CCFP FCFP Margo Rowan PhD Sophie-Claire Valiquette-Tessier Paul Drosinis MPH Lois Crowe William Hogg MD MSc MClSc FCFP

Abstract

Objective To examine the barriers to and facilitators of practice facilitation experienced by participants in the Improving Delivery of Cardiovascular Care (IDOCC) project.

Design Case studies of practice facilitators' narrative reports.

Setting Eastern Ontario.

Participants Primary care practices that participated in the IDOCC project.

Main outcome measures Cases were identified by calculating sum scores in order to determine practices' performance relative to their peers. Two case exemplars were selected that scored within ±1 SD of the total mean score, and a qualitative analysis of practice facilitators' narrative reports was conducted using a 5-factor implementation framework to identify barriers and facilitators. Narratives were divided into 3 phases: planning, implementation, and sustainability.

Results Barriers and facilitators fluctuated over the intervention's 3 phases. Site A reported more barriers (n = 47) than facilitators (n = 38), while site B reported a roughly equal number of barriers (n = 144) and facilitators (n = 136). In both sites, the most common barriers involved organizational and provider factors and the most common facilitators were associated with innovation and structural factors.

Conclusion Both practices encountered various barriers and facilitators throughout the IDOCC's 3 phases. The case studies reveal the complex interactions of these factors over time, and provide insight into the implementation of practice facilitation programs.

Editor's key points

- The Improved Delivery of Cardiovascular Care project aimed to use practice facilitation to help practices in eastern Ontario deliver better evidence-based cardiovascular care; however, analysis of the project did not reveal a clinically significant outcome.
- The authors conducted a retrospective qualitative study using 2 cases selected from practice facilitators' narrative reports to identify the barriers and facilitators contributing to program implementation in 2 participating practices.
- The analysis relied on a 5-factor framework (structural, organizational, provider, patient, and innovation) to contextualize the findings, and will be of interest to individuals implementing practice facilitation or other quality improvement programs.

Points de repère du rédacteur

- Le projet *Improved Delivery of Cardiovascular Care* visait à utiliser des facilitateurs de pratique pour aider les établissements de santé de l'Est de l'Ontario à dispenser des soins cardiovasculaires fondés sur des données probantes; l'analyse de ce projet n'a toutefois révélé aucun résultat significatif.
- Les auteurs ont effectué une étude qualitative rétrospective en choisissant 2 cas de rapports narratifs traitant de facilitateurs de pratique afin d'identifier les facteurs qui font obstacle à la mise en œuvre du programme et ceux qui la facilitent, et ce, dans 2 établissements participants.
- L'analyse portait sur 5 facteurs (la structure, l'organisation, le soignant, le patient et l'innovation) afin de remettre les observations dans leur contexte, un aspect qui intéressera les personnes qui mettent en œuvre les facilitateurs de pratique ou d'autres programmes pour améliorer la qualité de soins.

Mieux connaître les facilitateurs de pratique en travaillant sur le projet Improved Delivery of Cardiovascular Care

Une étude de cas rétrospective

Clare Liddy MD MSc CCFP FCFP Margo Rowan PhD Sophie-Claire Valiquette-Tessier Paul Drosinis MPH Lois Crowe William Hogg MD MSc MClSc FCFP

Résumé

Objectif Déterminer les facteurs qui, selon l'expérience de participants au projet *Improved Delivery of Cardiovascular Care (IDOCC)*, nuisent à la pratique ou la facilitent.

Type d'étude Étude de rapports narratifs portant sur des facilitateurs de pratique.

Contexte L'Est de l'Ontario.

Participants Les établissements de soins primaires qui participaient au projet IDOCC.

Principaux paramètres à l'étude On a identifié les cas en calculant le total les scores pour établir le rendement des cliniques par rapport à leurs pairs. On a choisi deux exemples de cas (les sites A et B) dont les scores s'écartaient le moins d'une déviation standard du score moyen total, pour ensuite faire une analyse qualitative des rapports narratifs portant sur les facilitateurs de pratique à l'aide d'une méthode à 5 facteurs permettant d'identifier les facteurs qui font obstacle à l'implantation du projet et ceux qui la facilitent. Les narratifs ont été divisés en 3 phases : la planification, la mise en œuvre et la durabilité.

Résultats Les obstacles et les facilitateurs ont varié au cours des 5 phases d'intervention. Le site A rapportait plus d'obstacles (47) que de facilitateurs (38), tandis que le site B rapportait un nombre à peu près égal d'obstacles (144) et de facilitateurs (136). Dans les 2 sites, les obstacles les plus fréquents provenaient de facteurs liés à l'organisation et aux soignants, tandis que les facilitateurs les plus fréquents étaient liés à l'innovation ou à la structure.

Conclusion Les deux établissements choisis ont connu un certain nombre d'obstacles et de facilitateurs au cours des 3 phases du projet IDOCC. Les études de cas ont révélé des interactions complexes et variables avec le temps, et ont permis de mieux comprendre la mise en œuvre des programmes pour faciliter la pratique.

Primary care providers must keep up with best practices in order to deliver the most effective care to their patients. However, many physicians struggle to change their practices in accordance with best-practice guidelines.[1] Practice facilitators (PFs) can help facilitate change by working with practices to assess current performance, help providers set goals for improvement, provide tools to deliver better care, and support practice reorganization.[1,2] Many studies on practice facilitation have shown positive results, demonstrating that PFs can help primary care providers adopt evidence-based guidelines and improve their delivery of care.[3-7] For instance, a practice facilitation program implemented in 9 primary care practices in New York State demonstrated statistically significant improvements in colorectal cancer screening rates,[6] and the Enhancing Practice, Improving Care trial conducted in Colorado found that a continuous quality improvement approach was associated with higher-quality diabetes care.[7] Implementation of practice facilitation programs has been associated with improvements in physicians' adherence to best-practice guidelines when providing diabetes care, smoking cessation advice, and cancer care.[8-10]

The Improved Delivery of Cardiovascular Care (IDOCC) project was a practice facilitation program conducted in eastern Ontario from 2008 to 2012.[11-13] Trained PFs worked with nearly 200 primary care providers in 84 family practices across the Ottawa region to help improve their delivery of evidence-based care for patients with or at risk of cardiovascular disease (CVD). The PFs began the intervention by conducting manual audits of 66 randomly selected charts from each practice in order to assess the practice's preintervention performance in areas pertaining to patient cardiovascular health. Practices received copies of these audits and worked with PFs to set goals and target areas in need of improvement. The PFs aimed to visit practices every 3 to 4 weeks during the first year of participation and every 6 to 12 weeks during the second year; however, PFs did not reach this objective and were only able to visit practices an average of 6.6 times in the first year and 2.5 times in the second.[13] Our study of IDOCC used a stepped-wedge randomized controlled trial design, which involved 3 steps, to evaluate its effect on providers' adherence to evidence-based guidelines, as reflected by a composite score measured at the patient level. A composite score was chosen instead of an individual primary outcome to provide an overall picture of each practice's performance.[12] The composite score included process indicators for assessing blood pressure, lipid profile, waist circumference, smoking status, glycemic levels (for patients with or at risk of diabetes), kidney function, prescriptions, and referral to smoking cessation programs. Upon completion of the analysis, the project showed no effect on the primary outcome of provider adherence to guidelines.[13] We have thus endeavoured to explore the reasons for this lack of effect.

Since IDOCC's completion, qualitative analyses of the program have been conducted using semistructured interviews with PFs and postintervention surveys completed by participating physicians.[11,14] By far most physicians held a positive view of the intervention. Physicians valued PFs for a number of reasons, including their ability to point out useful community resources, act as motivators for positive change, and provide an outside perspective on the practice.[14] However, our research also identified a number of frequently cited barriers to implementation of IDOCC: poor organization of the practice, accessibility, and engagement; resistance to change; and competing priorities.[11] To further explore these factors, we chose to analyze the narrative reports completed by PFs during the implementation process. This novel data set provides more immediate insight into the barriers and facilitators PFs encountered. Further, we have built on our existing research by applying an established framework to our analysis. Theoretical frameworks can provide a common and meaningful lens through which a single study's findings can be compared to a wider scope of literature, thus allowing for collective knowledge to be built across multiple studies.[15-19]

We have thus endeavoured to use a comprehensive, multilevel framework developed by Chaudoir et al[19] as a lens through which we can structure the barriers and facilitators experienced by 2 case exemplar practices during IDOCC's implementation. Exploring these barriers and facilitators through a detailed case study will provide insight into the challenges IDOCC encountered in achieving its outcomes. Our results will be of interest to those looking to establish practice facilitation programs in their own jurisdictions.

Methods

Design

This study used a retrospective qualitative case study design to examine the barriers to and facilitators of IDOCC's implementation identified by PFs. The Ottawa Health Science Network Research Ethics Board provided ethics approval for this study.

Data collection

Our study drew data from narrative reports that PFs completed after every encounter with practices, be it in person, over the telephone, or by e-mail. These reports included information on the practices' goals for the program, the activities they conducted, and the barriers to change that they perceived. The PFs were encouraged to complete their reports immediately after their encounters with the practices.

All 4 of the PFs held master's degrees in fields related to medicine or health science. In addition to having previous clinical or managerial experience, PFs underwent 7 weeks of intensive training on quality improvement and change-management techniques.

Sampling

Narrative reports were selected using a multistage purposeful sampling approach.[20] Of the 84 practices that participated in the study, 76 possessed a complete set of narratives.

We calculated the sum of the final postintervention composite scores for each practice in order to determine their performance relative to their peers. For each IDOCC condition indicator (eg, diabetes, smoking prescription), we identified practices that scored below 50% of the ideal score and those that scored below 10% of the mean value of their peers on the same indicator. Practices meeting these criteria were assigned a priority code of 1 for that indicator, indicating it was a top priority item. Indicators were summed and practices that fell outside of ±1 SD of the total mean score were excluded from the sample. The 51 practices included at this stage were considered "typical cases," in that they did not deviate substantially from the mean.

Data analysis

From the pool of 51 eligible narratives, we selected a subset of 15 cases that included at least 1 case from each of the trial's 3 steps and 7 practice models (ie, community health centre, health service organization, fee-for-service, family health group, family health network, family health organization, and family health team). We conducted a qualitative analysis of included reports using an open and axial coding style[21] and a constant comparative technique. We conducted a line-by-line reading of narratives to identify barriers and facilitators discussed in the text using the framework created by Chaudoir et al,[19] which distinguishes 5 factors or "constructs" where change can occur: structural, organizational, provider, patient, and innovation (**Table 1**).[19,22,23] The PFs were invited to review the draft findings to verify whether we had faithfully interpreted their narrative reports (ie, member checking); 2 of the 4 PFs responded and both agreed that the reporting of barriers and facilitators coincided with their recollections of practice experiences. Thirteen cases were coded before data saturation was reached (**Figure 1**). The results of this analysis are reported in a separate paper.[24]

In order to provide a more in-depth picture of the implementation process, 2 case exemplars were selected from this data set based on the richness and depth of information provided in PFs' reports and their representation of more common IDOCC practice types. These cases were reviewed in detail to support, deepen, and compare the pattern of results over the 3 project phases, each of which encompasses approximately one-third of the time during which the PF engaged with the practice: planning (phase 1), implementation (phase 2), and sustainability (phase 3). A research associate quantified information from the 2 case exemplars using Excel and then visually displayed and described patterns over time.

Results

Site characteristics

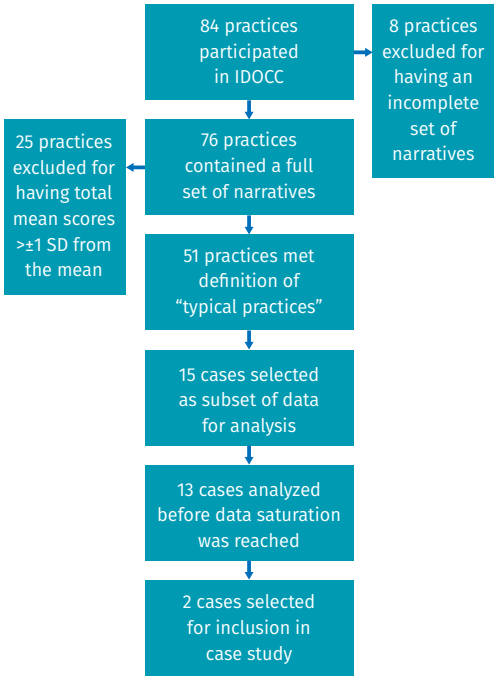
The 2 practice sites selected for this study varied in terms of practice model (community health centre [site A] vs family health group [site B]), the number of narratives completed (12 vs 29), and the PF assigned to them (PF 1 vs PF 2). **Table 2** presents the barriers and facilitators present in both sites over the 3 study phases.

Table 1. Constructs affecting implementation of health innovations

CONSTRUCTS	DEFINITION	EXAMPLES OR SUBCONSTRUCTS
Structural	"The outer setting or external structure of the broader sociocultural context or community in which a specific organization is nested"[19,22]	• Physical environment (eg, elements that pose barriers to health care access) • Political or social climate (eg, liberal vs conservative) • Public policies (eg, laws governing health care practices) • Economic climate (eg, funding available) • Infrastructure (eg, access to public transportation)
Organizational	"Aspects of the organization in which an innovation is being implemented"[19]	• Leadership effectiveness • Culture or climate (eg, extent to which an organization values and rewards an innovation) • Staff satisfaction or morale
Provider	"Aspects of the [team, practice, or group of providers] who implements the innovation with a patient or client"[19]	• Attitude toward evidence-based practice • Perceived control to implement an innovation
Innovation	"Aspects of the innovation that will be implemented"[19]	• Relative advantage of using an innovation beyond current practices • Quality of the evidence supporting the benefit of an innovation
Patient	"Patient characteristics ... that can impact implementation outcomes"[19,23]	• Health-related beliefs • Motivation • Personality traits • Behavioural risk factors (eg, alcohol misuse) • Beliefs and attitudes (eg, trust or mistrust of medical practices)

Adapted from Chaudoir et al.[19]

Figure 1. Inclusion of narrative reports in case study



IDOCC—Improved Delivery of Cardiovascular Care.

Site A

Practice site A is a community health centre. These clinics typically consist of interdisciplinary teams that have an expanded scope of health promotion and outreach services, and that focus on specific patient populations that might face barriers to securing health services.[25] The practice was involved in IDOCC for 12 months, shorter than the average 2-year period for a typical IDOCC practice, as it received the intervention in the trial's final step and thus data from its sustainability phase were not included in the findings of the original trial. Numerous providers work at this practice, including physicians, nurse practitioners, nurses, a dietitian, and a chiropodist. Upon completion of the practice's performance audit, 3 priority areas of focus arose: 1) obtaining target levels of screening frequency for hemoglobin A_{1c} measurement at first and second readings for patient with diabetes mellitus; 2) achieving target levels of screening frequency for low-density lipoprotein cholesterol measurement among patients with chronic kidney disease; and 3) improving rates of smoking reduction through patient counseling, referral to smoking cessation programs, or prescription of pharmacotherapy.

The practice focused on improving diabetes management, reassured by the PF that "[hemoglobin A_{1c}] was an issue and maybe they should focus on that" (May 2010). It

Table 2. Most common facilitators and barriers for sites A and B

CONSTRUCTS	COMMON SUBTHEMES
Structural	• Broader community health influences (eg, outbreaks of illnesses) • Communication (connecting with providers outside the practice) • **Community resources related to intervention—facilitators during the planning and sustainability phases*** • Educational and networking resources related to IDOCC • Macro-level economic and political environment (eg, financial resources from government)
Organizational	• Change in practice model (eg, to a different type of primary care model) • **IT and EMR (experiences or beliefs about IT and EMR)—barrier during implementation*** • Leadership • Micro-level financial resources (within the organization) • **Office efficiency (organization and management)—barrier and facilitator during planning and implementation*** • Space (characteristics of location or work and office areas) • Staff mix (availability and involvement of staff) • Time (time available)
Provider	• Communication between and among staff • Personal and staff functioning as part of a team • **Provider attitude toward the IDOCC intervention—barrier during implementation and sustainability phases*** • **Roles and responsibilities (clarity and scope of practice)—barrier during planning***
Innovation	• Awareness and insight of practice about processes needing adjusting • **Charting, flow sheets, and template (attitude and experience)—facilitator during implementation*** • Comprehending, complying, and agreeing with recommendations from IDOCC audit • Patient-physician processes (attitude and experience toward these, such as self-management) • **PF's capacity to spread learning from another innovation to the site—facilitator during implementation*** • **Reaction of practice to PF's involvement and advice—facilitator during implementation*** • Reminder system (attitude and experience)
Patient	• Very few patient-level barriers and no patient-level facilitators were identified

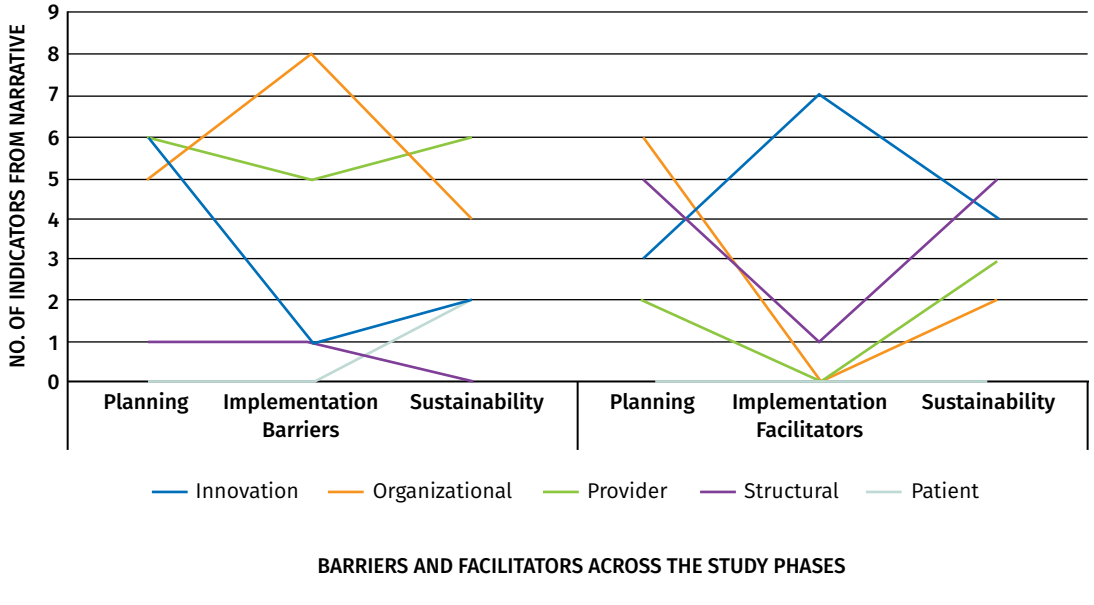
EMR—electronic medical record, IDOCC—Improved Delivery of Cardiovascular Care, IT—information technology, PF—practice facilitator.
*The most common facilitators and barriers identified in ≥25% of a given subtheme for either case, noted by program phase.

created a diabetes team and worked toward systematic recall and planning a registry supported by the electronic medical record (EMR). Providers received educational resources that they could distribute to patients in order to support better management of their conditions. These included leaflets instructing patients on how to test their blood sugar levels and "passports" or record cards allowing patients to track levels and observe their behaviour over time. The PF also offered a description of the service options provided by the Diabetes Regional Coordination Centre in order to provide additional support options. In terms of smoking reduction, the PF provided the site with smoking cessation guides, details of community-based studies and programs (eg, Smoking Treatment for Ontario Patients program[26] and the City of Ottawa ACESS program[27]), and information about learning webinars. The narratives provided no information on how the site addressed chronic kidney disease or whether this target area was addressed at all. The site also directed its efforts toward addressing other indicators or procedures outside of the priority areas identified by the PF. These items included screening for depression, developing a hypertension clinic, and engaging in patient waist circumference measurement.

Figure 2 provides the number and type of barriers and facilitators for site A across the 3 program phases (planning, implementation, and sustainability). The narratives for the site reported more barriers (n=47) than facilitators (n=38).

Barriers. Most of the barriers involved organizational (n=17; 36% of all barriers reported) and provider factors (n=17; 36%). Organizational barriers peaked during the implementation phase. At this point in the program, the site was preoccupied with training and adjusting to a new EMR system. In addition, the site leader left the practice without appointing a replacement. Provider barriers were consistent across the 3 phases and pertained mostly to staff attitude toward changing practice behaviour. Specifically, staff members noted that they were unable to find the time necessary to meet with the PF, as "every minute was going into EMR training" (September 2010). The introduction of the EMR seemed to "freeze" the IDOCC process for several months. The site expressed frustration with the lack of progress. Site members also expressed concerns regarding scope of practice and whether staff skills were being used optimally. Innovation barriers involved the site's initial failure to comprehend or agree with certain recommendations, such as questioning the value of measuring waist circumference as an indicator over assessing body mass index. Also, the site engaged in numerous activities outside of agreed-upon priority areas, despite the PF's caution that it was "often good to focus on one area at a time and define exactly what you were going to do otherwise projects morphed into each other and it was then difficult to see what had worked" (May 2010). These barriers were substantial during the planning phase, but decreased over time. Few structural and patient barriers were reported.

Figure 2. Number and type of barriers and facilitators for site A across the 3 program phases: *Indicators are areas that require focus within the practice, and the 5 factors (coloured lines) distinguish where change can occur.*



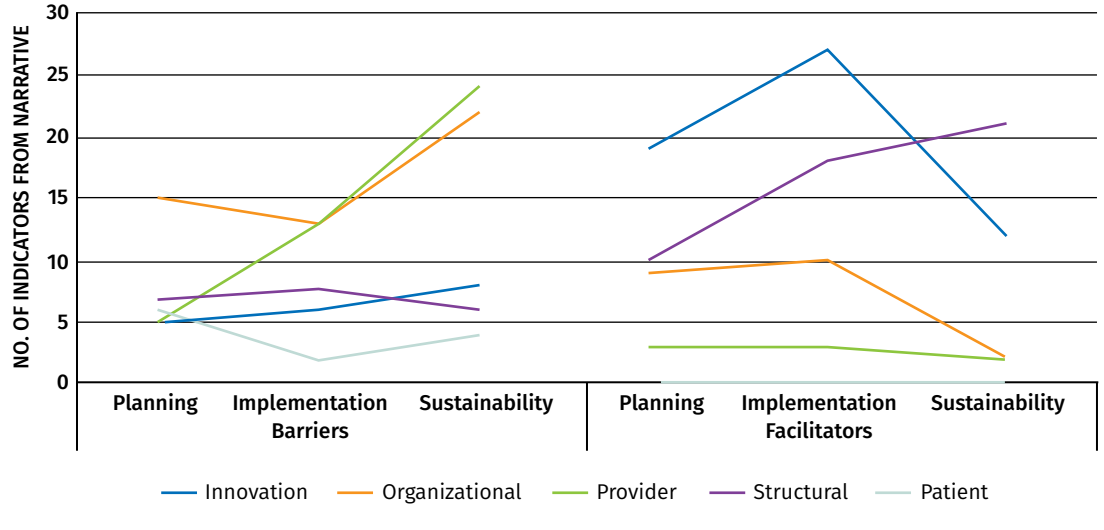
Facilitators. Facilitators were most often associated with innovation (n = 14) and structural (n = 11) factors, and were reported most prominently during implementation. The site embraced IDOCC support, was open to the idea of planning and change, and was eager to improve its management of patients with chronic conditions. Likewise, site members expressed appreciation for the PF's ability to incorporate knowledge or tools from other sites. The PF successfully introduced a number of resources used by other IDOCC practices, such as low-literacy handouts and screening tools for depression, and offered insight into alternative strategies for care delivery used by different sites. Structural facilitators mostly involved linking the site to resources in the community, such as pharmacists (who could provide MedCheck visits) and the YMCA-YWCA. Structural facilitators were least frequent during the implementation phase, the same phase during which organizational barriers were most common.

Site B

Practice site B is a family health group, a team-based family practice model in which 3 or more physicians work within a clinic and share office staff. Only 1 physician was directly involved in IDOCC for 24 months and is the focus of this narrative. A relatively high-performing practice, the site was already performing well along many measures addressed through the IDOCC program. The PF's practice audit identified smoking cessation as the main area of need. The PF worked with the site to support smoking cessation through various means, including counseling, referral to outside groups, and pharmacotherapy (eg, nicotine patches or gum). To support this improvement, the PF provided the practice with booklets and flow sheets on smoking cessation and informed the physician about local and provincial programs designed to help patients quit smoking. These included the Smoking Treatment for Ontario Patients Program,[26] which delivers treatment and counseling to patients free of charge. Further, a great deal of effort was put into assisting the physician with becoming more efficient in scheduling appointments, managing patients, and charting. Early on, the physician indicated that his present system was particularly cumbersome, redundant, and lacking in reminder or flow-sheet systems that integrate CVD prevention and management. In order to improve this aspect of the physician's practice, the PF introduced a waiting room screening form that asked patients about the reason for their visit and lifestyle information associated with CVD prevention and management; offered a number of flow sheets and assessment forms such as the Framingham Coronary Heart Disease Risk Assessment Tool and a CVD and diabetes flow sheet for high-risk patients; and encouraged the physician to type his notes directly into the EMR to avoid duplication of work.

Figure 3 shows the number and type of barriers and facilitators across the 3 program phases for site B. Barriers (n = 144) and facilitators (n = 136) were fairly balanced at this site. Most of the barriers involved

Figure 3. Number and type of barriers and facilitators for site B across the 3 program phases: *Indicators are areas that require focus within the practice, and the 5 factors (coloured lines) distinguish where change can occur.*



organizational (n=50) and provider (n=42) factors, both of which peaked during the sustainability phase.

Barriers. Two physicians left the practice during the planning phase, considerably increasing the patient case load of the physician involved in IDOCC. Further, the lack of organizational efficiency and negative attitude toward change limited the practice's capacity to embrace and sustain IDOCC. The physician was frequently overbooked, behind schedule, under pressure, tired, and frustrated: "I don't have a life. I don't get to the gym. I eat supper only after 8 PM. I know why people leave medicine to do something else" (May 2009). These issues appeared to affect patients as well. The PF reported one incident in which an angry patient, after expressing frustration at the long and frequent waits to see the physician, began verbally abusing and threatening staff before ultimately being escorted out by police.

Despite facing sizable scheduling challenges, the physician did not complete flow sheets, which could have helped to improve efficiency and provided incentive payments for eligible procedures. The physician dismissed the flow sheets as "just another task to perform along with [the] seemingly endless charting, billing, and administrative obligations" (May 2010). The physician's failure to complete flow sheets comprised the greatest innovation-level barrier reported by the PF. The narratives also indicated that the physician lacked time to fully complete patients' charts, yet was unwilling to make improvements that could have expedited this task such as learning to dictate notes. Office staff support was limited, and the PF reported finding "underlying tensions and frustrations due to … inconsistent work practices and time-management skills" (October 2010). After claiming that he was "drowning in paperwork" (June 2010), the physician considered hiring additional support to assist in charting and billing. However, no changes to this effect were reported in the narratives.

Patient and structural barriers were very much tied together. For example, the narrative noted the difficulty that the physician found it necessary "to balance time spent with patients and remuneration that can be billed" (March 2010), resulting in a perceived conflict of personal and work values. The physician had indicated to the PF that "sometimes I feel as if I am working for [the Ontario Health Insurance Plan] for free" (February 2009); most of the physician's patients had complex physical and psychological problems that required long appointment times.

Facilitators. Innovation (n=58) and structural (n=49) factors were the most common facilitators. Innovation factors peaked during implementation. Most striking was the physician's positive reaction to the PF's involvement and advice. For example, the PF described the physician's adoption of a modified notes page that led to improvements in efficiency and spread within the practice:

> [The physician] has not used the modified notes page [but rather] tends to jot rough notes during patient visits then expands the notes following the appointment. [The physician] mentioned [it] is familiar but laborious … [the physician] would try one or two while I waited. Initially while completing the notes [the physician] re-entered information and crossed it out … then tried another … the notes completion went more smoothly …. Since our last visit [the physician] has been using the revised note page … [and doing] less repetitive writing. [The physician] has approached the other physicians to review the redesign of the notes pages and they were pleased. (July 2009)

Learning about community resources available to patients was the biggest structural facilitator and was reported most frequently during the sustainability phase. The most commonly cited programs or initiatives pertained to diabetes treatment or management. Organizational facilitators involved a few changes made to improve office efficiency, including the willingness to pilot the patient problem identification tool during implementation. The PF reported few provider and no patient facilitators.

Discussion

Both practices encountered a variety of barriers and facilitators throughout the program's 3 phases. The case studies revealed the complex interactions of these factors. Further, exploring the 2 case exemplars highlighted in this study reveals a number of key lessons that could potentially inform subsequent interventions in primary care practice facilitation.

The first lesson underscores the limits of performance audits in informing subsequent practice change. While audit findings are key to identifying which indicators require focus during the IDOCC trial, a broader knowledge about practice readiness and functioning is necessary to deal with underlying issues affecting the practice's capacity for change. For instance, the disorganization and excessive workloads reported in site B made adoption of new strategies a challenge, as they negatively affected physician morale.

The importance of practice environment in the facilitation program's success was addressed in a meta-analysis of audit and feedback programs, which found that interventions had a higher likelihood of success if they were led by a supervisor or senior colleague, delivered on a monthly or more frequent basis, and offered in multiple formats (eg, verbal and written).[28] These items speak to the importance of practice organization and functionality in supporting facilitation. When these factors are not present, physicians might lack the time, motivation, and guidance to successfully apply PFs' advice. However, the meta-analysis also cited the presence of a specific action

plan as a key facilitator, which contrasts with our findings. While action plans have the capacity to support the implementation of PFs' suggestions, practices do not always use them to guide their changes. Such was the case in site A that chose to focus on indicators not highlighted by the audit. This limits the capacity of PFs, as advice given is not necessarily advice followed.[29]

Another issue raised by the case studies was the way in which multiple barriers can reinforce one another, making it difficult to address a root cause. This was seen in site B, where a confluence of barriers at the organizational, patient, and structural levels acted as a substantial impediment to change. The physician was often unable to complete patients' charts (patient-level factor), but chose not to develop tools that could expedite the process (structural), citing a lack of time and excessive case load (organizational). Fortunately, facilitators exhibit a similar compounding effect, as was also the case in site B. During the sustainability phase, the physician's positive reaction to the PF's advice (innovation-level facilitator) encouraged him to learn about and refer patients to community resources (structural).

Barriers and facilitators can also exhibit a "push-pull" relationship, wherein the increase in barriers at one level corresponds with the decrease in facilitators at another. Such a relationship was evident in site A, where an increase in organizational barriers during implementation (ie, issues of office efficiency and time) corresponded with a decrease in structural facilitators (ie, linking patients to community resources). This shift corresponded with the practice's adoption of a new EMR system, which can be time-consuming and frustrating for staff to learn. It is possible that the stress of this event not only raised barriers by reducing office efficiency as the staff adjusted to the change, but also distracted staff from learning about and promoting community resources. Such issues have been raised during the implementation of other programs. For instance, a qualitative study exploring family physicians' experiences with an audit and feedback system highlighted competing priorities as a key barrier to program implementation.[30]

Last, barriers and facilitators tended not to remain constant throughout the 3 phases of the intervention, but rather peaked at different points. In many cases, these "peaks" are likely context dependent. This could be seen in site A, where organizational barriers peaked during implementation in conjunction with the launching of a new EMR service. Additionally, some barriers might go through "natural stages," as they comprise an inherent part of the adoption process. For instance, site A exhibited innovation-level barriers during planning, when physicians expressed reluctance to follow new strategies for measuring obesity (waist circumference vs body mass index). These barriers tapered off over time, which might reflect the natural learning curve of physicians faced with changing a previously established practice.

Limitations

Our study has some limitations. We are limited by examining only 2 cases. Our analysis relies on PFs' reports of the implementation process and therefore depends on each PF's perception and relationship with members of the practice. Different PFs could potentially choose to include different levels of detail in their reports. While we selected practices that differed in a number of ways as our 2 exemplars, the nature of our case study limits its generalizability to other types of practices.

Conclusion

Our exploration of the 2 chosen cases provides insight into the possible causes of IDOCC's null effect. The case exemplars exhibited a variety of barriers and facilitators, which fluctuated over the intervention's 3 phases. Chaudoir and colleagues' framework[19] provided a useful lens through which we could compare the challenges faced by both practices. Both practices exhibited similar ratios between constructs as barriers and facilitators, with organizational- and provider-level barriers and innovation- and structural-level facilitators being most common in both sites. Our findings suggest the importance of applying models such as Chaudoir and colleagues' framework while implementing innovations, as they provide an effective means of identifying and addressing the complex interplay between barriers and facilitators. While frameworks act as an important lens through which innovators can view implementation, the needs and challenges to be addressed will vary between locations. An in-depth exploration of the target site is thus vital to account for barriers and facilitators in place in multiple constructs.

Dr Liddy is Clinician Investigator at the C.T. Lamont Primary Health Care Research Centre of the Bruyère Research Institute and Associate Professor in the Department of Family Medicine at the University of Ottawa in Ontario. **Dr Rowan** is Principal Lead of Rowan Research and Evaluation and Assistant Professor in the Department of Family Medicine at the University of Ottawa. **Ms Valiquette-Tessier** is a doctoral student in the School of Psychology at the University of Ottawa. **Mr Drosinis** was a research assistant at the C.T. Lamont Primary Health Care Research Centre of the Bruyère Research Institute. **Ms Crowe** is Research Manager at the C.T. Lamont Primary Health Care Research Centre of the Bruyère Research Institute. **Dr Hogg** is Professor in the Department of Family Medicine at the University of Ottawa and Senior Research Advisor at the C.T. Lamont Primary Health Care Research Centre of the Bruyère Research Institute.

Contributors

Dr Liddy contributed to the study design and oversaw the study's implementation, data analysis, and manuscript preparation. **Dr Rowan** and **Ms Valiquette-Tessier** facilitated data collection and conducted the analysis. **Mr Drosinis** and **Ms Crowe** contributed to the data analysis. **Dr Hogg** conceived of the idea, arranged initial funding, assisted with implementation, and contributed to the data analysis. All authors helped draft, read, and approved the final manuscript and agree to act as guarantors of its contents.

Competing interests

None declared

Correspondence

Dr Clare LIddy; e-mail **CLiddy@bruyere.org**

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